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AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows. This listing of claims will replace all prior listings.

1. (CURRENTLY AMENDED) A method for controlling an auxiliary power unit (APU), comprising:

detecting an inlet temperature; and

varying an APU shaft speed ~~based on the~~ in response to the inlet temperature to maintain a corrected speed between a minimum mechanical speed and a maximum mechanical speed.

2. (ORIGINAL) The method of claim 1, wherein the varying step comprises:

increasing the APU shaft speed when the detected inlet temperature increases; and

decreasing the APU shaft speed when the detected inlet temperature decreases.

3. (CURRENTLY AMENDED) The method of claim ~~3~~2, wherein the varying step further comprises:

calculating ~~a~~the corrected speed from the APU shaft speed and the inlet temperature; and

maintaining the corrected speed within a selected optimum region with the increasing and decreasing steps.

4. (ORIGINAL) The method of claim 3, wherein the optimum region corresponds to a substantially constant corrected speed.

5. (ORIGINAL) The method of claim 4, wherein the substantially constant corrected speed is between 95% and 105% of a design speed.

6. (ORIGINAL) The method of claim 3, further comprising:

overriding the maintaining step during a power transfer operation between the APU and a main engine.

7. (ORIGINAL) A method for controlling an auxiliary power unit (APU), comprising:

detecting an inlet air temperature;

calculating a corrected speed from an APU shaft speed and the inlet temperature; and

maintaining the corrected speed within a selected optimum region by varying the APU shaft speed based on the inlet air temperature, wherein the APU shaft speed is increased when the detected inlet air temperature increases and wherein the APU shaft speed is decreased when the detected inlet air temperature decreases.

8. (ORIGINAL) The method of claim 7, wherein the step of calculating the corrected speed comprises dividing the APU shaft speed by a normalized inlet temperature value calculated from the inlet temperature.

9. (ORIGINAL) The method of claim 7, wherein the corrected speed in the optimum region is between approximately 95% and 105% of a design speed.

10. (ORIGINAL) The method of claim 7, further comprising:

overriding the maintaining step during a power transfer operation between the APU and a main engine.

11. (ORIGINAL) The method of claim 7, wherein the maintaining step further comprises adjusting a flow through the APU.

12. (WITHDRAWN) An auxiliary power unit (APU) control system, comprising:

a temperature sensor that detects an inlet temperature;

a processor that calculates a corrected speed based on an APU shaft speed; and

a controller that increases the APU shaft speed when the detected inlet temperature increases and decreases the APU shaft speed when the detected inlet temperature decreases to maintain the corrected speed within an optimum region.

13. (WITHDRAWN) The control system of claim 12, wherein the controller keeps the corrected speed substantially constant to maintain the corrected speed within the optimum region.

14. (WITHDRAWN) The control system of claim 12, wherein the substantially constant corrected speed is between 95% and 105% of a design speed.

15. (WITHDRAWN) The control system of claim 12, wherein the controller allows the corrected speed to move outside the optimum region during a power transfer operation between the APU and a main engine.

16. (WITHDRAWN) The control system of claim 12, wherein the optimum region also corresponds to a flow range, and the controller adjusts a flow through the APU to reach the optimum region.

17. (NEW) The method of claim 1, further comprising the steps of:

defining the minimum mechanical speed as 85%Nmech; and

defining the maximum mechanical speed at 107%Nmech wherein %Nc = %Nmech/(THETA)^0.5.

18. (NEW) The method of claim 1, wherein the varying step is in response to a compressor map.